CHAPTER I: INTRODUCTION

The Seattle-King County Department of Public Health established the Infant Mortality Review (IMR) Project in 1992 to systematically monitor infant deaths and identify factors that contribute to infant mortality. The need to evaluate infant deaths emerged from concerns about the slow decline in the infant mortality rate observed in King County in the mid to late 1980s and the persistent disparity in rates between whites and African Americans.

The findings of the Infant Mortality Review have been described in the report issued by the IMR Project in August 1996,[1] which contains information on statistical trends in infant death through 1994. This report updates these trends through 1995.

DATA SOURCES

This report is based on data obtained through vital records (birth and death certificates) collected by local and state health departments. In addition, 1989 income data from the 1990 U.S. Census was used for the analysis of infant mortality rate variation across income groups.

The birth and death certificate computer data files used to produce this report are generated yearly by the Washington State Department of Health. They are distributed to the local Health Departments in the second half of the following year. For example, data files for 1996 will be available late in 1997. Therefore, this report contains data only through 1995.

HOW TO READ THIS REPORT

This report uses a number of epidemiological methods and technical terms to analyze data on infant mortality. The following definitions and explanations will assist the reader in reading the report.

Epidemiology: The study of the distribution and determinants of health conditions in a specified population.[2]

Infant Mortality Rate: The infant mortality rate is the number of live born infants who die before reaching their first birthday in a given year, for every 1000 infants born alive in that year. For example, if 1000 infants were born in a town in 1995 and 7 died in that year, the infant mortality rate would be 7.0 deaths per 1000 live births.

Rolling Averages: For populations of small size, small changes in the number of events can cause large fluctuations in rates making year-to-year changes difficult to interpret. To help stabilize the rate for the examination of a time trend of an event, the rates are aggregated into "rolled" averages (such as in 3 or 5 year intervals) across the total observed period. For example, if there is a highly fluctuating rate caused by low numbers of events for years 1990 through 1995, the rates are instead reported as three-year rolling averages: 1990 to 1992, 1991 to 1993, 1992 to 1994, and 1993 to 1995. Each set of three year averages includes a higher number of cases than a single year and thus smoothes out random year-to-year fluctuations.

Significant Trend: Epidemiologists use a statistical test called the chi-square test to see whether a change in a rate over time is statistically significant. A significant trend indicates that the change in a rate is not random and that an increase or decrease is likely to be occurring in a population. Trend tests are always applied to year-by-year trends, not rolling averages. In most cases, when the trend is declining, the year with the highest rate is chosen as the starting point to test for trend significance. Alternatively, when the trend is increasing, the year with the lowest rate is chosen. The significance

level used for a significant trend in this report is $p < 0.05$. Only statistically significant trends are noted in the figures.

Rate Ratio: The rate ratio is the ratio between rates for two different groups. For example, if the infant mortality rate for African Americans is 20 per 1000 live births and that for whites is 10 per 1000, then the rate ratio is 20/10 = 2.0. This means that African American infants are 2.0 times as likely to die as compared to white infants.

Regions and Small Areas: Because infant health varies across the different areas of King County, we present data on infant deaths broken down by small areas and larger regions of the County. Small areas are 21 geographically-defined communities created by grouping together census tracts (definitions are available upon request). The four regions used in this Report (North, Central, East and South) are in turn groupings of the small areas of King County as described below:

North Region:	North of Canal Area, North King County, North Seattle
Central Region:	Central Seattle, North Central Seattle, Southeast Seattle, West Seattle
East Region:	Bellevue, Bothell/Woodinville, Eastgate/Issaquah, East/Northeast King County, Kirkland/Redmond, Mercer Island
South Region:	**Southwest Sub-Region:** Federal Way, Highline/Burien, Vashon, White Center/Skyway **Southeast Sub-Region:** Auburn, Kent, Renton, Southeast King County

Race: Epidemiologic analyses frequently examine group differences in rates of disease or injury based on characteristics such as age, gender, and race/ethnicity. In recent years, the presentation of data broken down by race/ethnicity has been questioned by researchers and communities; they argue that readers may incorrectly assume that differences between groups are biologically based, and that the racial/ethnic categories used are not necessarily reflective of individuals' self-identification.

Most researchers believe that race/ethnicity is a marker for complex social, economic and political factors that are important influences on community and individual health, and that differences in rates of most diseases and injuries are not due to biologic or genetic differences among racial/ethnic groups. Many communities of color in this country have experienced social and economic discrimination, and other forms of racism, which can negatively affect the health of these communities. We continue to examine and present data by race/ethnicity because we believe that it is important to understand which racial/ethnic groups are disproportionately affected by significant health issues. We hope this understanding will lead to strategies that address these issues, as well as the social and economic inequities which underlie them.

This report uses the Federal Office of Management Budget, Directive Number 15, race and ethnicity categories. The Directive specifies four racial categories: white, African American, Asian/Pacific Islander, and Native American, as well as a Hispanic ethnicity category. A person of Hispanic ethnicity can be of any race.

Poverty Terciles: No easily accessible data[a] exist indicating how many King County infants are born into poverty. Therefore, we compared infant mortality rates between those living in poorer and more

[a] Birth certificates do not assess maternal income. Information on source of payment for prenatal care has been collected since 1992. Source of payment can serve as a proxy for income because mothers whose source is classified as Medicaid or charity care are likely to have low incomes. The birth certificate also contains information on the educational attainment of the mother, which is an important measure of socioeconomic status. However, information on education is missing on 15.5 percent of birth certificates.

affluent areas within the county. The U.S. Census provides data for each census tract on the proportion of female residents age 12 to 64 who live in households with incomes below the poverty line.[b] A census tract is a geographic area which contains approximately 4,000 residents. We grouped the 285 census tracts in King County by terciles into the following groups: high, medium, and low poverty level areas. The one third of tracts with the highest proportion of female residents living in poverty are defined as the high poverty tracts.

Classification of Causes of Infant Death: Infant deaths are caused by a wide range of conditions. To better understand the pattern of infant death, we have grouped these conditions into seven categories:[c]

1. Prematurity (including prematurity, low birthweight, respiratory distress syndrome, bronchopulmonary dysplasia, and necrotizing enterocolitis)
2. SIDS (Sudden Infant Death Syndrome)
3. Congenital anomalies
4. Perinatal conditions (including other perinatal respiratory conditions, birth trauma, hypoxia, perinatal/neonatal asphyxia, perinatal infections and other perinatal conditions).
5. Other infections (e.g., pneumonia, meningitis)
6. External causes (e.g., positional/accidental asphyxia, motor vehicle accident, trauma, burns, etc.)
7. Other miscellaneous (e.g., cardiac arrythmia, cardiopulmonary arrest, and umbilical cord compression).

Low Birthweight: A newborn weighing less than 2,500 grams (5.5 pounds) is considered to be low birthweight.

Preterm/Premature Birth: The average pregnancy lasts 40 weeks. An infant born at less than 37 weeks gestation is considered premature or preterm. The gestational age of a newborn is calculated as the interval between the newborn's date of birth and the first day of the mother's last menstrual period before she conceived.

Kotelchuck Index To Measure Adequacy of Prenatal Care (PNC): The Kotelchuck Index measures the adequacy of the initiation and quantity of prenatal care visits.[4] This index considers initiation of prenatal care, number of prenatal care visits and gestational age in determining an Expected Visit Ratio [(number of visits/expected visits) x 100]. If this ratio is 0, then no prenatal care was received. A ratio of less than 50 percent means "inadequate prenatal care", from 50 to less than 80 percent means "intermediate prenatal care", from 80 to less than 110 percent means "adequate prenatal care", and 110 percent or more means "more than adequate prenatal care".

Smoking: Data on smoking have been collected on birth certificates since 1984. It is defined as maternal smoking during pregnancy, without specification of number of cigarettes smoked per day, or trimester of pregnancy during which mother smoked. Data from 1984 have not been reported here because of technical problems with its collection. Data from 1989-1991 have also not been included in this report because the question regarding smoking was revised and moved to a different part of the birth

---

[b] $12,674 per year for a four-person household in 1989, the year for which the U.S. Census collected information.

[c] The National Infant Mortality Survey (NIMS) classified infant's causes of death into eleven categories, based on the International Classification of Diseases, 9th revision, (ICD-9).[3] NIMS categories have been regrouped into seven categories for simplification. For further details, see "Healthier Mothers, Healthier Babies: Declining Infant Mortality in King County, August 1996, Appendix A, p. 123-133."[1]

certificate in those years, changing the responses for those years and making the data non-comparable. For the remaining years used in this report, data on smoking is missing in about 5.2 percent of birth certificates.

Alcohol Consumption: Data on maternal alcohol consumption during pregnancy and number of drinks per week have been collected on birth certificates since 1989. No specification of trimester of pregnancy during which mother consumed alcohol has been collected. Data on maternal alcohol consumption is missing in about 13.9 percent of birth certificates used in this report.

Marital Status: Data on mother's marital status have been collected on birth certificates since 1980. It is only denoted whether mother is married or not, without further specification of the various possible relationships between the parents of the baby. For example, it is not indicated whether the mother is separated or actually living with her husband. It is also not indicated whether the recorded marital status pertains to the actual father of the baby or to a different partner. Lastly, the various relationships single mothers may have with the birth father are not distinguishable. For example, a single mother may be the sole caretaker of her child, or she may be living with the infant's father or have other sources of support.

Births to Adolescents: The adolescent birth rate refers to the number of births among females age 15-17 years old. Births to younger teens age 10-14 were relatively uncommon and were, therefore, not included in the analysis (refer to cited report for further clarification of choosing this age group).[5] The adolescent birth rate can be calculated by taking the total number of births occurring among all 15-17 year olds during a specified time period, and dividing it by the total number of 15-17 year olds in the population. It can be interpreted as the number of births per year among 1000 females age 15-17.

Managed Care Plan: The Washington State Department of Social and Health Services (DSHS) Medical Assistance Administration (MAA) created the Healthy Options program to make mandatory enrollment in managed care the predominant health care delivery model for Medicaid recipients. The program's chief goals were to increase access to appropriate medical services and reduce costs. The Healthy Option program requires certain groups of Medicaid eligibles to enroll in a managed care plan and to choose a single Primary Care Provider within that plan to be responsible for providing or arranging for all covered medical care 24-hours-a-day, seven-days-a-week.

REFERENCES

[1] Krieger J, El-Bastawissi A, Dickson A, Kline C, Holland S, Fabian P, Schroeder C, and Alexander ER. Healthier Mothers, Healthier Babies: Declining Infant Mortality in King County, August 1996.
[2] Adapted from: Last, JM. A Dictionary of Epidemiology. New York: Oxford University Press, 1985.
[3] Centers for Disease Control and Prevention: Advance report of final mortality statistics, 1990. Monthly Vital Statistics Report 1993; 41(7)suppl:9-11.
[4] Kotelchuck M: An evaluation of the Kessner adequacy of prenatal care index and a proposed adequacy of prenatal care utilization index. Am J Pub Health 1994; 84:1414-20.
[5] Krieger J, Adams C, Talltree C, and Stewart L. Changing Direction: An Update on Teen Pregnancy and Birth in King County, April 1996.